



New England Fishery Management Council

50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116

Dr. John F. Quinn, *Chairman* | Thomas A. Nies, *Executive Director*

To: Tom Nies, Executive Director
From: Scientific and Statistical Committee
Date: November 22, 2019

Subject: Terms of Reference – Overfishing levels (OFLs) and acceptable biological catch (ABC) recommendations for Atlantic scallops for fishing year 2020 and 2021 (default)

The SSC met on October 17 and 18, 2019 in Boston, MA to address the following terms of reference (TORs):

- 1) Review changes to meat weights used to develop 2019 survey estimates, and growth and selectivity parameters used in the SAMS model to project biomass in portions of the Nantucket Lightship. Provide the Council with a recommendation as to whether these changes are appropriate.

- 2) Review the Scallop PDT's updated projections for the scallop resource, and provide the Council with OFL and ABC recommendations for fishing years 2020 and 2021 (default).

To address these TORs, the SSC considered the following information:

- 1.1 Terms of Reference for Sea Scallops for October 17 & 18, 2019, SSC Meeting
- 1.2 SSC Final Report on OFL and ABC for Scallop Framework 30, November 20, 2018
- 1.3 Scallop PDT recommendations for 2020 and 2021 (default) OFL and ABC
- 1.4 Sea scallop assessment summary for 2018 (SARC 65, August 2018)
- 1.5 Hart, D.R. Quantifying the tradeoff between precaution and yield in fishery reference points. ICES Journal of marine Science, doi.10.1093/icesjms/fss204.
- 1.6 Draft Framework 32 measures under consideration
- 1.7 Risk Policy Matrix - Atlantic Sea Scallops
- 1.8 Scallop PDT recommendations for 2019-2020 (default) ABC, dated October 4, 2018
- 1.9 Yochum, N. and DuPaul, W.D. Journal of Shellfish Research, Vol. 27, No.2, 265-271, 2008.
- 1.10 Hennen, D.R. and Hart, D.R. Shell Height-to-Weight Relationships for Atlantic Sea Scallops (*Placopecten magellanicus*) in Offshore U.S. Water. Journal of Shellfish Research, 31(4):1133-1144. 2012.
- 1.11 Hart, D.R. and Chute, A.S. 2009. Estimating von Bertalanffy growth parameters from growth increment data using a linear mixed-effects model, with an application to the sea scallop *Placopecten magellanicus*. ICES Journal of Marine Science, 66: 2165-2175.
- 1.12 Miller et al. Estimation of the capture efficiency and abundance of Atlantic sea scallops (*Placopecten magellanicus*) from paired photographic–dredge tows using hierarchical models Canadian Journal of Fisheries and Aquatic Sciences, 2019, 76:847-855, <https://doi.org/10.1139/cjfas-2018-0024>
- 1.13 SARC 65 – Scallop Appendix A1 – Sea Scallop Growth
- 1.14 SARC 65 – Scallop Appendix A2 – Scallop Shell Height/Meat Weight Relationships (Draft report for peer review)
- 1.15 Scallop PDT Meeting Summaries: a. August 27-28, 2019; b. September 4, 2019; c. October 1, 2019

TOR

The SSC accepts the shell height to meat weight adjustments that have been used to develop the 2019 survey estimates, growth, and selectivity parameters used in the SAMS model to project biomass in portions of the Nantucket Lightship. The changes are appropriate and are consistent with methodologies and calculations historically used.

The SSC recommends the following OFL-total and ABC-total (metric tons):

Year	OFL	ABC
2020	59,186	50,460
2021	47,503	40,430

RATIONALE INCLUDING SIGNIFICANT SOURCES OF UNCERTAINTY

The SSC notes that the fishery is not overfished and overfishing is not occurring. Additionally, the fishery has not exceeded the ABC or ACL since Amendment 15 was enacted, indicating good performance of this fishery. The OFL has been set to the equivalent of the catch associated with F_{msy} ($F=0.64$). The ABC control rule sets catch at a 25% probability of exceeding OFL ($F=0.51$). These control rules are deemed adequate to account for the scientific uncertainty in this fishery. Risk in the scallop fishery is evaluated in terms of the probability of overfishing compared to the fraction loss of yield.

ADDITIONAL COMMENTS

Increased growth will result in a higher ABC, but in areas where scallop densities are high, this growth may not happen as there appears to be density dependent growth in this population. This is something that should be considered in future assessments of this stock.

Recruitment has been low in recent years, with the exception of a new year class observed in Closed Area II and surrounding areas in 2019. In the fishery access areas, the fishery is harvesting the available strong year classes, but in some areas these year-classes are disappearing faster than what was expected (specifically the Nantucket Lightship West Area) when considering both fishing and assumed natural mortality rates. This does not represent a threat to the stock at this point but is something that should be closely monitored.

It was noted that by keeping fishing mortality low, biomass should increase and catch rates will go up. This would allow management to have resources in reserve, keeping the fishery sustainable and profitable. There is a cohort effect in the management areas in the sense that the scallops that are available this year will be the same “cohort” that will be around in the following year, therefore tracking the progression of these cohorts can provide valuable information to the management of the fishery.

The current assessment uses meat weight to estimate spawning stock biomass. NMFS scientists are still considering the use of gonad weight to replace mean weight to calculate biomass, as gonad weight might be a better surrogate for SSB and therefore egg production. This should be considered for inclusion in the next assessment and could probably be evaluated in a level 3 Management track assessment process. This would allow some of the comments raised regarding the timing of spawning and multiple spawning events to be addressed. There are differences in the spawning timing between Georges Bank and the Mid Atlantic areas. A remaining question that will need to be investigated is how best to integrate these temporal and spatial differences in to the existing assessment.

SUMMARY OF RECOMMENDATIONS

- **The SSC accepts the shell height to meat weight adjustments that have been used to develop the 2019 survey estimates, growth, and selectivity parameters used in the SAMS model to project biomass in portions of the Nantucket Lightship.**
- **The SSC recommends the following OFL-total and ABC-total (metric tons): 2020 OFL-total = 59,186; 2020 ABC-total = 50,460; 2021 OFL-total = 47,503; 2021ABC-total = 40,430**
- **The Virginia Institute of Marine Science is collecting gonad samples. The SSC believes this work may help in considering a change from meat weight to gonad weight in preparation for assessment changes during a level 3 Management Track or Research Track assessment.**
- **The SSC also supports continued work to examine the effect of scallop density on dredge and survey estimates.**